The Northwestern MILLER
MILLING PRODUCTION SECTION

How to Plan a Safety Program

By Ralph M. Hartmann

Editor's Note—The accompanying article is the text of an address presented by Mr. Hartman at the milling session of the 1951 Central States Safety Congress.

PROBLEMS and conditions affecting accident prevention activities vary in the different companies. Some companies have decentralized organizations with operating units at different locations, while other companies have a single unit organization; therefore, we may expect to find different management organizations present. Some companies represented here today employ only a few people—others have several thousand employees. However, since it is generally accepted that the fundamentals of accident prevention apply equally well to plants of all sizes, it would then appear true that whatever responsibilities management people have for safety in larger mills, the management people in the smaller companies would have similar responsibilities.

I have found that in many companies there are three distinct management groups present—top company executives and staff officers, including the president, vice presidents and staff departmental managers usually comprise one group; in another group are found the top mill or plant management personnel, consisting usually of the manager, assistant manager and superintendent and there is also a mill or plant departmental group, made up of department managers, their assistants and foremen.

The management organization in your company may not follow this pattern; nevertheless, there is a management organization present, and its different groups have specific responsibilities for safety.

It has always been my belief that those people who are actively engaged in accident prevention work are generally aware of what management's safety responsibilities are; but oftentimes experience difficulty in getting management to discharge effectively these responsibilities. Therefore, it is my intent to call attention to only a few of the more important safety responsibilities of these different management groups and which responsibilities, I feel, must be fulfilled if the accident prevention program is to function effectively. Also, to relate some practices found generally effective by different companies in aiding management members in fulfilling these responsibilities. The mill safety officer's job will be considered separately.

Let's consider first the safety responsibilities of the top company management group.

In some companies safety policies have been confusing and inadequate because they have been treated as matters of expediency or because accident prevention has been received as a necessary evil rather than the important function that it is.

Top management must first establish a sound policy on safety. This policy to recognize that accidents are, with rare exception, unnecessary and preventable; that the company will take every reasonable precaution to safeguard its employees; that continuous research and study will be employed to develop safe work methods, and adequate training in these methods will be provided all employees. Policy should also indicate that the company believes in "Safety first, quality second, production third."

Put It in Writing

In order for top management's policy on safety to be of assistance in promoting accident prevention, it must be a published statement made clear to all executives and employees. This policy should be issued by no less a person than the company's chief executive. Let me repeat for emphasis that we must have, first, a sound safety policy; that it must be in written form, and not just so much "lip service"; that it must be made available to all executives and employees; and in order for it to mean something it should be issued by the company's chief executive.

A second major safety responsibility of top management necessitates that top company officials set the safety standards desired (including housekeeping), and a definite commitment be made as to how far the company will go to attain and maintain those standards.

A written statement indicating the standards that must be maintained should be furnished top mill personnel by company management. Line executives — managers, superintendents, foremen, and other supervisors —should be specifically charged with the responsibility for maintaining these standards and for the safety of all employees working under their direction.

In addition, it is expedient that top management be thoroughly convinced that the prevention of accidents is essential to economic operation and require that a follow-up of all safety recommendations affecting operation become a required and routine function of the operating department.

Executives Have Responsibility

Company executives also have a responsibility to show continuous interest in the safety program. This to be accomplished by participating in company safety meetings and personally acknowledging safety achievement.

Top company management has many other safety responsibilities. Some, you will probably consider of more importance than those I have enumerated above. Based on my experience, they seemed to me to be the most important, largely because they are the things that I needed most from top management and did not always get.

Let's take a look at some of the major safety responsibilities of our second management group, which includes mill or plant managers, assistant managers and superintendents.

1. First the manager must do his part—which is to put safety "on the map," make it a necessary part of production, get back of it and keep back of it so actively that every person in the mill will know just what the company proposes to do to help make the plant a safe place to work. The active and sincere participation of top mill personnel is absolutely essential to any accident prevention program.
2. In larger plants, provide a competent full-time safety director, with adequate staff, facilities, and budget, acting in an advisory capacity to "line" executives and supervisors; in smaller plants, a part-time safety director, combining this responsibility with personnel or other allied functions; and even in the smallest plant the designation of some individual to be responsible for safety activities.
3. To establish procedure at his mill that will carry out the accident prevention program effectively.
4. To attend and participate actively in safety committee meetings.
5. To make a careful examination and study of the statistics of accident reports to determine trends, predominant types and causes of accidents, and best methods of prevention.
6. Top mill management must exact the same degree of attention to safety as is required in production methods. If safety is treated as a side issue by top mill management people, certainly supervision will treat it likewise.
7. Should provide for the continued training of the Safety Director so that the program may be kept in step with new developments and techniques.

Assistance from Management

Top mill management can discharge some of the above safety responsibilities by:

1. Including safety in all top management planning, discussions, reports, etc. Watch it, control safety like other production costs and problems are controlled.
2. Convince all plant personnel by visible signs in the form of mechanical guards, good lighting, etc., that plant management is doing its full part in promoting accident prevention activities.
3. Add prestige of top man's attendance at all safety committee meetings. How many mills and plants have managers and superintendents who feel it is below their dignity to be present at safety meetings?
4. Display an active and sincere interest in accident prevention by spending time in the production departments, looking for hazards, and seeing that the hazards are eliminated; talking to workers about safety and doing those things that they expect the other man to do in promoting safety. It just isn't enough to have "lip service" by management indicating that a good safety job needs to be done. Management must get out into the mill and be seen performing accident prevention work.
5. How about the superintendent issuing a weekly safety letter to all department managers and foremen outlining and calling attention to things to be done during the week.
6. Make sure that every supervisor is doing his duty in prescribing safe work methods, rules and regulations. Back up the supervisor in the enforcement of safe work standards.
7. Arrange for Safety Director to

(Continued on page 3a)

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Safety Program

(Continued from page 1a)

participate in special training courses and to attend local and national safety meetings. I know of a number of companies which, either as an economy measure or for other reasons, refuse to permit their safety officers to attend safety conferences and conventions.

Another management group is the mill or plant departmental people, consisting of department managers, their assistants and foremen.

As that part of management in direct contact with the workers, the foreman is your key executive in making any safety campaign effective. Made responsible, and given the authority to enforce observance of safety rules, your foreman can translate safety plans into safety results. May I emphasize that point? Foremen are the key members of management in the adminstration of any safety campaign. The worker's attitude toward safety depends to a great extent on the attitude of the supervisor. He must, by what he says and does every day, convince his men that he is doing everything possible to promote safety for them.

Duties of Supervisors

Major safety responsibilities of this group include:

1. Supervision must supplement the plant safety program with their own plan of control of accidents. This includes analysis of departmental accidents, inspection and maintenance of machinery and equipment, investigation of all accidents, personal contact with employees to develop safe attitudes, delegation of specific departmental safety responsibilities, and proper placement and training of employees.

2. Supervisors must consider the supervision of safety a major responsibility in their departments.

3. Responsibilities of the supervisors or foremen include corrective action to prevent causes of accidents. Accidents oftentimes result from attempts to speed production without giving adequate thought for the welfare of the worker. Foremen are the only direct management contact with the workers; therefore, they should be authorized to initiate corrective action if unsafe or improper conditions are found.

4. To show every worker what safe work means to himself, his family and fellow workers.

5. To constantly observe, inspect and detect any conditions, work habits, or attitudes which might cause an accident.

6. Plan and conduct effective departmental safety meetings at regular intervals.

7. Develop a plan for periodic safety contacts with each worker and set a constant safety example. It is most important that he personally discuss safety with his workers.

8. To personally investigate every accident in his department, to determine where the safety program failed and to devise means to prevent a recurrence.

Establish Safe Practices

Again we have the question, "What are some of the things management members of this group can do to discharge effectively the above responsibilities?"

1. Safe practices must be established for the jobs which are performed at the work place. Once these are explained to employees, little difficulty should be experienced in seeing that they are observed. It should be borne in mind that good discipline in respect to safety regulations and practices is just as important as good discipline in any other area. Disregard of safe practices must not be permitted—it is the foreman's duty to insist upon compliance with established safety procedures—he must never condone unsafe acts.

2. Each foreman should talk with two or more of his employees individually, each day, for at least five minutes on the subject of safety. I think this is most important in order to develop a safety consciousness on the part of workers. I sometimes have the feeling that supervisors in our particular company never think of safety while on the job.

3. Make periodic inspections of the department accompanied by representative department employees.

4. Since we place a great deal of emphasis upon the importance of the foreman's responsibility for the safety of the employees under his supervision, it is, of course, fitting that top mill management devote attention to the training of that foreman in carrying out these responsibilities. All foremen should be given the "Safety Management for Foremen" course which is available from the National Safety Council, and is built around a series of some ten sound slide films. In addition supervisors should be given training in first aid methods.

5. Make full use of counsel and aids made available by the Safety Department and top management.

6. Appoint a department safety committee and rotate members periodically.

7. Provide and encourage and insist upon the wearing of protective equipment.

8. Keep tools and machines in proper repair and adjustment with emphasis on safe maintenance procedures.

Make Safety a Habit

It is at the work place that the success or failure of any safety program will be determined. Success in accident prevention work depends upon the relationship between the foreman and individual worker who is actually performing the job. Everything we do through top management action, through the work of our safety staff, the promotional work we do by means of contests and posters, should be directed toward the objective of making safety an active part of the day in and day out relationships on the job.

Now for just a few minutes let's direct our thinking to the safety officer. I presume that most of the people present are charged with the safety responsibility in their respective companies. The responsibilities and duties of the plant safety officer are very well known by those people actively engaged in accident prevention work. Not much could be accomplished by reviewing at this time his generally known and accepted responsibilities and duties. Instead let's consider some of the things the safety officer can do which will assist management members in fulfilling their safety responsibilities and will aid in the promotion of the mill accident prevention program.

1. When discussing safety engineering proposals with your top management people, make it very clear that you are virtually interested in saving money as well as preventing accidents. It is amazing how quickly a manager will participate when he sees that you have not only studied the best safety device, but that you

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2. In most companies plant safety committees are present. Usually top plant management members are represented on the committee. How about occasionally having your safety committee go out into the plant to visit in different departments and to discuss safety individually with the different workers? This would do much to prove management's concern and interest in accident prevention.

3. As another means of encouraging your top mill management people to participate in the safety program, how about having the superintendent send out a weekly safety letter to all foremen. To get this activity under way, you might prepare several proposed letters for his examination. You should have no difficulty in selling the superintendent on this activity, and if carried out, it will do much to impress supervision of management's concern for safety.

4. A sensible and practical accident analysis report presented in a clear business-like manner will create management interest and encourage participation. As frequently as practicable charts and graphs should be used to summarize this data.

5. Prevail upon your top mill or plant management people to go out into the mill to see the job, whether it be the case of an accident or an engineering problem.

6. Experience proves that constant watchfulness and personal contact is the answer to accident prevention. I would say that it is most important that you see what is going on in your plant. It takes a good, live person with enthusiasm and clear thinking to go over the plant daily to find the different hazards existing in each department. It is important that you see what is wrong and let the employees see you. Some people feel the safety engineer should spend some 60 to 70% of his time in the operating departments.

7. How about utilizing locally-prepared safety posters? We recently learned at our different mills that we had among our employees some very gifted cartoonists who have come up with safety posters that have created much interest in safety among our employees.

8. When an individual applies for a job, his mind is pliable. Everything possible should be done to direct his attention to safety. During the interview he is to be given an opportunity to tell you his previous safety experience; whether or not he suffered any injuries; if he served on any committees; and something of his activities in that respect. During the physical examination the physician has an excellent opportunity to emphasize safety and stress the importance of reporting all injuries to the first aid room. The safety director must explain the safety organization in effect, discuss personal protective equipment needed, and particularly should emphasize safety rules applying to the employee's particular department. The safety director must see that these particular people who come in contact with the new employee emphasize safety.

9. Safety engineers should build their program around functions to be performed, not around personnel. This has a tendency to discourage the feeling that any department head or supervisor is above participating in the program.

10. It is also most important that the safety engineer be progressive. Secure all the training possible in

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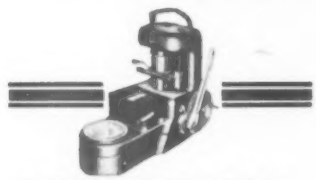

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11. Many practical and worth while safety articles appear regularly in various publications which have application to our particular operations. We have not hesitated in copying these articles verbatim and distributing same to our people. A good practice is to make the articles available to the mill manager, and for him to distribute to foremen and supervisors.

Gentlemen, in closing I would like to say that during the relatively few years that I have devoted to industrial training and safety work, my biggest problem has been in getting top management to participate actively in training and safety activities. Probably the most important challenge confronting plant safety officers today has to do with causing all management members to discharge effectively their safety responsibilities. We have just that type of an almost impossible job which challenges the best that is in us. It behooves all of us to continue our efforts to sell safety to top management and to strive to secure active participation of all management people in accident prevention work.

—BREAD IS THE STAFF OF LIFE—

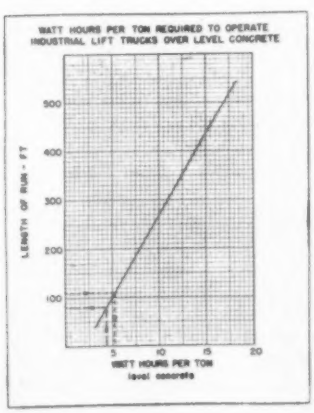
How to Determine Battery Needs for Industrial Trucks

By J. E. VAUGHAN
Supervisor Field Engineering
Gould-National Batteries, Inc.

DETERMINATION of capacity of storage batteries which power electric industrial trucks is often left to the truck supplier, the battery representative, just plain guess or duplication of present batteries. However, there is an engineering procedure, which, if followed, will enable the purchaser to correctly specify his own battery requirements or check suppliers' recommendations. In addition, these calculations will insure against purchasing under-capacity batteries which run down before the end of the shift, or conversely, over-capacity batteries calling for unwarranted initial cost.

To illustrate the procedure for determining industrial truck battery capacities we will assume a typical case —a 3,650 lb. truck, 2,000 lb. load, 3 ft. average lift, 110 ft. average haul and 30 ft. 10% grade to be traversed by loaded trucks.

It will be necessary to determine the power (watt hours) required to traverse the average haul distance loaded, climb the grade, traverse the haul distance empty (grade deducted), lift the load for stacking and tilt the mast for load-centering.



The accompanying graph indicates the watt hours per ton required to move a truck along a given length of level run. We can use this graph to determine the power required to travel the average haul distance. By following the dotted lines we see that 5.4 watt hours are required to haul one ton along the 110 ft. haul of our example. Our total load is 3,650 lb. (truck) plus 2,000 lb. (load)—5,650 lb. or 2.825 tons. Multiplying 2.825 tons by 5.4 watt hours gives 15.25 watt hours required for the level run.

We can determine the watt hours required for going up grade (in addition to that required for level running) by using the formula: watt hours=tons (truck plus load) × ft. (length of grade) × grade (per cent) × .013 (a constant). 2.825 tons × 30 ft. × 10 × .013=11.02 watt hours (extra power for grade).

Then to calculate watt hour requirements for the empty return trip, deducting the grade, we have the 110 ft. total return distance less the 30 ft. of grade, or 80 ft. Again using the graph (dashed lines), we see that 4.4 watt hours are required per ton on the return trip. As the weight is now 1.825 tons, we multiply 4.4 watt hours by this figure getting 8.03 watt hours.

To determine the watt hours required for lifting, we use the following formula: watt hours per lift= tons of load × feet of lift × 2 (a constant). Thus, 1 ton × 3 ft. × 2= 6 watt hours required to lift the load. (For unstacking, the following formula applies: watt hours per lift empty=½load capacity in tons × feet of lift × 2.)

To determine the energy required to tilt the mast, we use the following formula: watt hours per tilt loaded= tons of load × 1 (a constant). Thus 1 ton × 1= 1 watt hour per tilt load-

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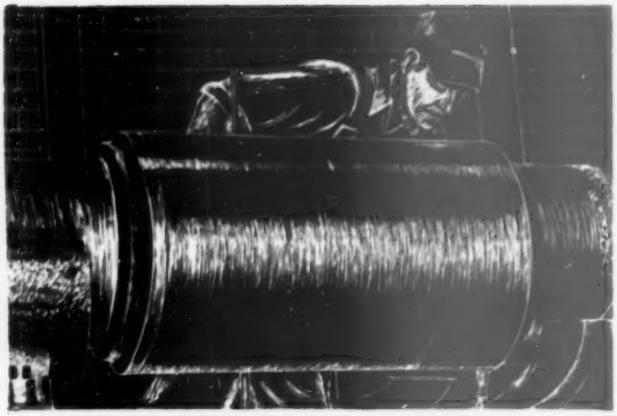

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ed. (Watt hours per tilt empty = ⅓ load capacity × 1.)

Summing up we have:

	watt hours
Run with load, no grade	15.25
Extra power for grade	11.02
Run empty, grade deducted	8.03
Power required per lift	6.00
Power required per tilt	1.00
Watt hours per trip	41.30

Assuming 250 trips a day, a total of 10,325 watt hours of battery power are required. If we select a 32 volt battery, as recommended by truck manufacturers for this size truck, it must have approximately 323 ampere hour capacity. (Ampere hours equal watt hours divided by volts, hence the ampere hours required equals 10,325 watt hours divided by 32 volts or 323 ampere hours.) Battery manufacturers' catalogs give ampere hour capacities of various sized cells.

By following this procedure, the purchaser can effect economies which will be reflected in multiple since future purchases of batteries for given applications will be based on original computations.

Formulas used are from the Handbook of Material Handling published by the Electric Industrial Truck Assn., 1950.

—BREAD IS THE STAFF OF LIFE—

Break Wetting

The term Schrotnetzung (or break wetting) is applied in Germany to a supplementary wetting of the wheat immediately prior to the first break. This principle is used quite extensively on the Continent to prevent fragmentation of the bran.

The grain (which has often been dried to 14% moisture content) is thoroughly moistened but left to stand only long enough for the outer layers to be penetrated by the water. In this way the bran may be removed more readily without the condition of the endosperm being affected.

The German milling engineers, MIAG, claim to have introduced a suitable machine for this supplementary wetting or conditioning just before the first break. The water is added by means of an "electro-atomizer" and special containers are designed for holding the wheat during treatment. These are cones which are fitted above the roller mills.

—BREAD IS THE STAFF OF LIFE—

Iron v. Porcelain Rolls

Probably the first roller mill to be made was constructed in 1753 and was described in the patent application as a "new sort of cast metallick roll for crushing, flattening, bruising or grinding of malt, oats or other grain."

Rolls made in Europe about 1823 and 1824 were not mechanically sound and it was not until a Hungarian nobleman persevered with the Sulzberger chilled iron roll that any mill was found to be successful.

In 1867 this mill was remodeled with 210 pairs of rolls, producing middlings which were ground to flour in later sections of the mill. This was the beginning of the automatic gradual reduction system as it is known today.

Early developments included four-pair high mills and porcelain rolls. With the introduction of the chilled iron roll in 1874, there was some competition between it and Wegmann's porcelain roll but the former type became accepted as providing the most suitable medium for the precision grinding of a range of products, including soap, paint pigments, chocolate, cereals, etc.

AOM Wheat Survey Report

EACH year the Association of Operative Millers serves as a clearing house for its members, exchanging and disseminating information on the milling characteristics of the current wheat crop. Committees representing different sections of the U.S. are appointed to report information and these reports are consolidated.

The following information regarding the milling characteristics of the 1951 crop was reported in a recent special bulletin issued by the association. Following is a summary of the information contained in the bulletin regarding the 1951 crop of hard red winter, hard red spring and soft red winter wheats:

Hard Winter Wheat

Hard Red Winter wheat of the 1951 crop does not have the total and patent flour recovery noted in the 1950 crop wheats. This is particularly true for Kansas and Nebraska wheats which were badly bleached in some sections. Bleached wheats of Kansas and Nebraska show very mellow milling characteristics with middlings that are easily reduced.

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	1950	1951
	%	%
Total flour yield ...	73.0	71.2
Patent flour yield..	79.3	78.6

The test weight of the 1951 HRW wheat crop is generally lower than the 1950 average in all areas except Texas. The lower test weight of the 1951 crop is due to a large extent to field bleaching of the wheat. Many wheats in north central and eastern Kansas and Nebraska areas are thin and would reflect lower test weight than the 1950 crop without field bleaching. Wheats from western Kansas and eastern Colorado areas show about the same to slightly lower test weights, compared with the 1950 crop, even though field bleaching was not very prevalent.

The average test weight of the hard winter wheats of the 1951 crop from the five-state region is 59.8 lb., compared with 60.3 lb. for the 1950 crop.

Moisture Content—Average wheat moisture of the 1951 crop is generally high for all of the southwestern states except Colorado. The high moisture content is a result of the prolonged wet harvest season. The 1951 crop averaged 13.5% moisture compared with 13 for the 1950 crop.

Protein Content—Wheats from the 1951 crop harvested in Texas, Nebraska and Colorado show a higher average protein content compared with 1950 wheats. The 1951 crop in Kansas and Colorado was slightly lower in protein compared with the 1950 crop. The highest protein wheats are available in Texas. The five-state averages for protein content are 12.70% for the 1950 crop and 12.54% for the 1951 crop. Those percentages are based on 14% moisture.

Ash Content — Texas, Oklahoma and Colorado wheats from the 1951 crop average higher in flour ash content, as compared with the 1950 crop flours. Highest ash is noted in western Oklahoma, western Kansas and Colorado wheats. Kansas and Nebraska wheats of the 1951 crop, on state-wide averages, are lower in ash content compared with 1950 crop wheats. The average ash contents of the flours for 1950 and 1951 crops for the five-state area are: 1950, .398%; 1951, .395%.

Baking Characteristics—In general, the baking characteristics of southwestern wheats of the 1951 crop are good, with the exception of the moisture-damaged and badly bleached wheats of southeastern Nebraska and the adjacent area in Kansas. Texas wheats have produced flours with baking characteristics similar to the 1950 crop wheats. A greater percentage of the 1951 crop appears more suitable for bakers' blends or mixes than was the case with the 1950 crop.

Kansas wheats, in general, have produced flours possessing better baking characteristics when compared with flours milled from the 1950 crop. There were a few regions where the crop suffered bleaching because of the prolonged rains, however.

Nebraska wheats from the south-central and southwestern sections of the state produce flours with good baking characteristics also. Practically all of the wheat from the southeastern area of the state, however, have produced flours of lower than average baking quality due to the presence of damaged wheat, most of it also being badly bleached.

Tests made with Colorado wheats show results similar to those obtained from the 1950 crop. The majority of Colorado's wheats are suitable for the production of bakery flours.

The average absorption figure for hard red winter wheats from the five-state area is less for 1951 wheats than for the previous crop. The average for 1950 was 58% compared with an average of 56.8% for the 1951 crop. An increase in absorption is noted in Oklahoma and Texas wheats. Conversely, a decrease is noted in the absorption value for Kansas wheats.

As regards oxidizing requirements, Oklahoma wheats require a normal amount and are quite tolerant to over-oxidation. Kansas and Nebraska wheats show very little need for oxidation and are not tolerant to increased amounts.

The malt flour requirements for the 1951 crop are similar to the 1950 crop.

Protein content considered, the loaf volume potential for 1951 crop flours is good and in general it is similar to or better than 1950 crop flours.

Hard Spring Wheat

Unfavorable harvesting weather prevailed in much of the spring wheat area in 1951, resulting in much of the crop being weathered or bleached and a considerable amount of sprout damage. In North Dakota Mida continues to be the leading wheat variety grown. It is produced almost exclusively in the eastern and central areas with some acreage devoted to the Rival variety. In the

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western quarter of the state, Thatcher is the predominating variety.

Mida is also the leading variety grown in South Dakota. Rival and Ceres are grown to a limited extent. In Montana, Thatcher predominates in the eastern area with some Rescue being grown. Marquis and Ceres are grown in the central region of the state. Mida also appears to be the leading variety in Minnesota with Rival and other varieties being grown in certain sections.

Test Weight—The average test weight of the 1951 crop of spring wheat is generally lower than for the 1950 crop, with the exception of South Dakota. This is due probably to the higher moisture, as the wheat is generally plump and well-filled except for some Montana wheats. The average test weight for the four-state area of Minnesota, North and South Dakota and Montana for the 1951 crop is 59.4 lb., compared with 60.1 lb. for the 1950 crop.

Milling Characteristics — Flour yields on experimentally milled wheats from North and South Dakota are lower on the 1951 crop than those obtained from 1950 crop wheats. Extraction of patent flour, however, is better in all spring wheats from the 1951 crop compared with the previous year's crop. The four-state averages are as follows:

	1950 %	1951 %
Total flour yield ...	74.0	72.5
Patent flour yield..	82.5	85.6

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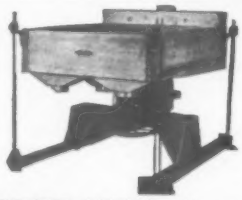

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slightly higher in protein content than were wheats of the 1950 crop, with the average protein content of Minnesota wheats unchanged. South Dakota average protein is slightly lower for 1951 than for 1950.

A weighted average for the 1951 crop for the four-state region is 13.6%, .2% higher than the 1950 crop.

Wheat Moisture—Due to adverse weather during the harvest season, the wheat moisture is higher in all states for the 1951 crop. The 1951 average moisture content was 13.3%, compared with 12.5% for the 1950 crop.

Flour Ash—Generally speaking, most of the spring wheats have milled very well and this milling value has been reflected in lower flour ash content except for Montana wheats of light test weight. The 1951 crop to date has averaged .407% ash on a straight flour, compared with an average of .402% for the 1950 crop.

Baking Characteristics—The baking results reported here are based primarily on flours milled from sound wheat. Wheats from North Dakota have been generally good with a majority of the tests showing desirable characteristics of the flours. From South Dakota wheats, the results have been good and comparable to those obtained from North Dakota wheats. Montana wheats tested showed generally desirable baking characteristics quite similar to those obtained from 1950 crop wheats. Baking tests on Minnesota wheats show a good average with only occasional scattered samples showing questionable baking characteristics.

Absorption—To date absorption is good and very similar to that found with 1950 crop flours. The four-state average absorption values are: 1950, 65.9%; 1951, 66%. Indications are that the absorption value will decrease as more of the bleached and sprout-damaged wheats are used.

The prevalence of sprouted wheats in sections of North Dakota, South Dakota and Montana have resulted in high enzymatic activity and as a result there is little need, if any at all for malt flour. The problem with 1951 crop wheats will be to keep enough sound wheat in the mill mix to reduce the gassing power of the flours.

Soft Winter Wheat

The soft wheat crop of the central states, like the hard red spring wheat crop was the recipient of heavy rains just prior to harvest. This condition has brought about some adverse milling and baking characteristics to the soft wheat crop. The moisture content of the soft wheat crop has averaged from 1 to 1½% higher than for the 1950 crop, with an overall moisture in the wheat running from 14 to 14½%. The higher moisture content and the accompanying bleaching due to excess moisture at harvest time, has also lowered the test weight from about one half pound per bushel in some areas to as much as two pounds in other areas, as compared with the 1950 crop.

The overall-average test weight for soft wheats of the 1951 crop is 58.5 lb.

The protein content of the 1951 soft wheat crop is higher, ranging from approximately the same as for the 1950 crop to as much as .7% higher in some areas, with the crop as a whole ranging from 10 to 11% protein—about one half percent higher than for the 1950 crop.

Experimental milling results of the 1951 crop are similar to those of the previous year with the exception of flour ash content which appears to be slightly higher.

Baking characteristics generally indicate that the 1951 crop flours do not have as good a color as produced from 1950 wheat. Other baking characteristics of 1951 crop flours are generally good and are quite similar to 1950 crop flours.

Modernization a Century-old Habit at Jonathan Hale & Sons

THE latest step in what has been a continuous program of modernization by the Jonathan Hale & Sons, Inc., plant at Ionia, Mich., was taken about a year ago when the company entered into a contract with the Allis-Chalmers Mfg. Co. for four 4-section, 17-high free-swinging sifters complete with driving assemblies, Texrope drives

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and the necessary H-beam supports. Other new machinery installed at the same time were two rebolt sifters and two agitators.

Before setting up any of the new machinery, a new matched maple floor was laid over the old yellow pine flooring on the sifter and purifier floors. In addition, all new metal-lined white pine spouting was installed between the elevator discharge heads and the sifter landing as well as between the sifter discharges and the purifiers and other machinery on the floor below. This work was completed last July and was done by a group of millwrights under the direction of Ralph Thewlies.

The modernized mill is extremely efficient and flexible with a rated daily capacity of 800 sacks. In addition, it is able to produce 300 sacks of stone-ground graham flour and 150 sacks of whole wheat flour.

The Hale company also operates a custom grinding and feed mixing plant adjacent to its mill. This plant was modernized in 1950 with the installation of new equipment which included two hammermills, a corn sheller, two cob crushers and two vertical feed mixers. The company also operates a grain receiving elevator and custom feed grinding plant at Saranac, Mich.

Keeping abreast of the times is second nature for the pioneer milling firm. It has been doing just that for nearly 100 years.

Since its founding in 1856, to the present the company has been constantly alert to newest developments in milling. This pattern was set by the late Jonathan Hale, its founder.

Mr. Hale, a native of Stratford-on-Avon, England, was apprenticed at an early age to the Earl of Warwick to learn the milling and baking trades. He came to the U.S. in 1853 and three years later started his own small mill in Oakland County, Mich. It was not long before the capacity of the mill was outgrown. To accommodate his expanding business, Mr. Hale obtained a larger plant at Rochester, Mich. There he was joined by his brother Jack and in 1865 the partnership of Hale Brothers was formed.

The two brothers had hardly finished with the remodeling of their mill when it was destroyed by fire. Undaunted by their loss, they purchased the Gothic Mills at Lyons in Ionia County, Mich. Possession was taken in January, 1866.

Changes of vital interest to every progressive miller were made here.

Clyde F. Davis (left), mill superintendent at Jonathan Hale & Sons, Inc., shows Laurence I. Hale, president of the firm, some of the stock from one of four 4x17 newly installed Allis-Chalmers free-swinging sifters on the fourth floor of the mill.

A considerable amount of new spouting was installed in the Hale mill during its remodeling. Shown above is a view on the third floor, including spouting from sifter outlets to purifiers, bran finishers, etc.

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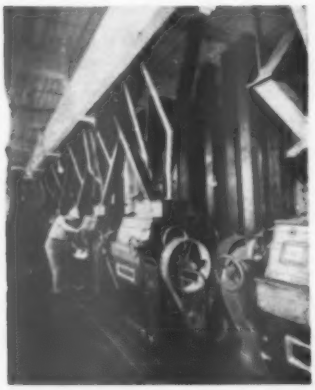

Supt. Clyde F. Davis inspects stock from one of eight double stands of mill rolls on the second floor of the plant of Jonathan Hale & Sons, Inc., Ionia, Mich. This floor is equipped with four double stands of 9x30 ball-bearing rolls and four double stands of 9x24 ball-bearing rolls.

About 1871, Hale Brothers purchased two of the newly invented middlings purifiers. The mill was licensed to manufacture so-called patent flour under the equipment's patent.

It was not long after this that an entirely new type of milling was introduced—the Hungarian or roller process. In 1881, Hale Brothers adopted the roller process. The concern was among the first mills in Michigan to make the conversion. In connection with this change-over, the mill was remodeled, the old mill stones discarded and its output increased.

In February, 1896, Elmer B. Hale and his brother, Lewis H., purchased from their uncle his interest in the mill, and the firm name was changed to Jonathan Hale & Sons.

The business continued to prosper and it became apparent that the mill at Lyons could no longer accommodate the increase. Consequently, it was decided to dispose of the buildings and waterpower and to erect a larger mill at Ionia, Mich. It was there that the present plant was built in 1915.

The existing mill is of reinforced concrete and vitrified brick and is four stories high with full basement. Construction includes steel sash with wire glass windows and all openings protected with automatic fire doors. Stairways and partitions are of fireproof materials and the wheat cleaning departments are enclosed in fireproof walls with heavy fire doors. Machinery installed was of the latest type and included all new and improved methods. All machines are equipped with ball bearings and all line shafting is carried on roller bearings. The plant is served by two railway sidings.

Originally the mill was powered by an Allis-Chalmers twin-cylinder diesel engine driving through a clutch and

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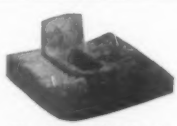

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rope drive. In 1948 the plant was electrified and the diesel engine now serves as stand-by power. At present the roll line, the wheat washer and feed packers are driven by a 75-h.p. Allis-Chalmers ball-bearing, slip-ring motor. The sifters, purifiers and elevators are powered by a 40-h.p. ball-bearing, totally-enclosed, fan-cooled motor.

Several of the machines are individually driven by small motors. Controls for the main motors are centralized in a panel group on the roll floor and emergency stop controls easily accessible to the millers are provided on every floor.

Following the death in 1939 of Lewis H. Hale, the business has been conducted by Laurence I. Hale, grandson of the founder. Elmer B. Hale died in 1924. Laurence I. Hale entered the firm's partnership in 1919 following his discharge from the U.S. Air Service during World War I. He is a past president of the Michigan State Millers Assn.

The Development of the Gradual Reduction System

IT WAS in 1877 that British millers realized that a new system of milling that was in use in Europe was rapidly stealing the favor and trade of the British Isles.

Until some 100 years before that time, bread had always been manufactured from a meal, and because nobody had ever known anything different, this meal-bread was readily accepted. However, in the light of present day experience, it can easily be understood that this type of bread was not always palatable or digestible. Some millers had given this problem their attention; after all, we know now that our native wheat varies, and how much different is the loaf made from some imported wheats, and millers began to try to make a change in their products to suit their customers. Particularly with soft English wheats, where the proportion of bran is inclined to be large, did the miller find that the elimination of the bran improved the loaf, and it was realized that it was just as important for a "good" loaf to look, to taste and to keep well, as for it to be nourishing.

A laborious system was introduced of grinding and sieving. The millstones were set high and the wheat was broken so that the floury portion could be released without breaking up the bran skins. This broken "chop" was carried up to the top of the mill again in bags and fed down through a sieve on to the stones again, which were this time set more closely to grind the stock to a smaller particle size. The rough bran was kept on one side, depending on the condition of the wheat and the skill of the miller, so did the color and standard of the "middlings" to the second grind vary. The bran was ground up to a feed or mixed back into a later make of meal.

In those days, mills were mainly of a single pair of stones and the capacity was small, so that the stock was bagged and carried up by manpower to the top of the mill. The more gradual the process of milling, the more manual the work required, and by constant resetting of the stones for each grind, it was never possible to insure a regular product, while much time was wasted.

It can easily be seen that as the system became more gradual, and the capacity of the mills was increased, these two items became unmanageable. A series of stones was then introduced, each set for a particular grind and type of stock, and the harnessing of mechanical power was soon introduced to move the stock without requiring manual work, which would, by speeding up the process, increase the capacity of the mill.

Wheat was broken on a series of stones, each set more closely than the preceding pair, and the stock was sieved after each grind to remove the coarser branny stock from the middlings, which were ground to flour without the large amounts of bran that had hitherto been permitted to contaminate the finished products.

This system produced a much more satisfactory meal, but considerably more expenditure was required in maintenance, space, power and cost, so that some continental millers soon realized that these must be cut down to make milling at all profitable.

A number of inventions in the early 19th century pointed to the replacement of the large millstones with a roller mill, but it was not till 1874 that the mechanical imperfections of the roller mill were sufficiently eliminated for it to become popular as a replacement for the old-established methods.

Rolls took up much less space and power, and would not require the constant attention and dressing that stones required; however, it was the perseverance of a Hungarian Count that brought about the operation of the first really successful automatic mill that employed a system of gradual reduction.

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This invaluable reference book will be received by all readers of The Northwestern Miller as a Section Two of the April 22, 1952, issue. The new Almanack will continue and expand the valuable statistical and informational service regarding crops, production, regulations, etc., for which this annual edition serves as an ever-handy "reference library."

Your advertising message will be seen time and again throughout the year in the Almanack as this indispensable volume will be retained and referred to repeatedly by readers who will be most receptive to your advertising.

Send in your space reservation today and assure yourself ample time in which to prepare your advertising copy, which can be accepted not later than March 1. Use the handy space reservation form below. Mail it today.

Features of the 1952 ALMANACK will be these departments, with their own material, such as

FLOUR—
Packaging Laws
Production
Exports and Imports
World Import Duties

GRAIN—
Wheat Standards
Corn Standards
Contract Grades
Elevator Capacity

BAKING—
State Baking Laws
List of Industrial Movies
List of Baking Schools
Census Report
List of Largest Bakeries

FEEDS—
Rules Governing Feed Trade
Definitions of Grain By-Products
Feedstuffs Analysis Table
Farm Animal Population
State Laws

FOREIGN—
Regulations
Bleaching Flour, Self-rising Flour
Packaging

MAIL COUPON TODAY

SPACE RESERVATION ORDER for 1952 ALMANACK Advertising

Advertisements are available to you in the following sizes and dimensions, at the rates indicated:

	Size Width		Depth	Price per insertion
Full page	7	x	10	$100.00
⅔ Page	4⅝	x	10	70.00
½ Page	7	x	4⅞	
		or		
	4⅝	x	7½	55.00
⅓ Page	4⅝	x	4⅞	
		or		
	2⅛	x	10	37.50
¼ Page	7	x	2½	
		or		
	4⅝	x	3⅝	30.00
⅛ Page	2⅛	x	4⅞	
		or		
	4⅝	x	2⅛	21.00

Special Positions—2nd and 3rd covers—$25.00 extra; 4th cover—$30.00 extra. Color red required.
Extra Colors—Red ..... $ 25.00 per page or less
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Bleed Off Charge—$10.00. Plate size 8⅜x11⅛, trim size 8⅛x11¼ inches.

ALMANACK Advertising Dept.
The Northwestern Miller
118 South Sixth Street
Minneapolis 2, Minn.

Please accept our order for an advertisement ..... inches deep by ..... columns wide to appear in the April 22, 1952, ALMANACK edition of The Northwestern Miller.

FIRM NAME .....
ADDRESS .....
.....
SIGNED ..... DATE .....

Making good foods better

You could not hope to meet today's consumer demand for fine, white flour with old-time water-powered equipment. Yet you know that today's flour unavoidably loses valuable nutritional benefits in the milling. How sensible it is that you remedy this loss by restoring the most important vitamins and minerals through the modern, simple process of enrichment.

For ten years now you have helped the nation's health through enrichment. And because of its great value, enrichment of patent flour and white bread has been supported by legislation in the majority of States and Territories through the work of physicians, nutrition experts, the consuming public, bakers, and millers.

Be proud that you serve the public health so well. By keeping faith with nature you make good foods better!

TODAY'S "BATTLE OF BATAAN"

Vitamin fortified white rice is saving thousands of lives in winning the battle against beri-beri disease and death in the Philippines. This important work proves again the value of enrichment. When you enrich you can say: "Look at the benefits to health my products supply."

For the fascinating story of the Bataan health project in detail, write today to the Vitamin Division.

VITAMIN DIVISION • **HOFFMANN-LA ROCHE INC.** • NUTLEY 10, N. J.

In Canada: Hoffmann-La Roche, Ltd., Montreal, Que.

Keeping faith with nature

ROCHE

VITAMINS FOR ENRICHMENT

BALANCED CLEANING

BALANCED HC CLEANING

Equipment that performs the right type of separation in the right place—that's what you need for "balanced cleaning." Balanced cleaning is efficient, economical, PROFITABLE. These are important advantages you can count on when you install Hart-Carter equipment. The machines pictured on this page are skillfully engineered—designed for thorough cleaning and accurate grading, for economical operation and upkeep, compactness, and sanitation. Ask Hart-Carter to recommend the machines that will fit into your *balanced cleaning* program.

HART-CARTER COMPANY

673 19th Ave. N.E. • Minneapolis 18, Minn.